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IS 4947 (2006): Specification for Gas cartridges for use in fire extinguishers - [CED 22: Fire Fighting]



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भारतीय मानक
अग्नि शामकों में प्रयुक्त होने वाले गैस कार्टिज — विशिष्टि
(तीसरा पुनरीक्षण)

Indian Standard
GAS CARTRIDGES FOR USE IN
FIRE EXTINGUISHERS — SPECIFICATION
(*Third Revision*)

ICS 13.220.10

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BUREAU OF INDIAN STANDARDS
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NEW DELHI 110002

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Price Group 2

FOREWORD

This Indian Standard (Third Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Fire Fighting Sectional Committee had been approved by the Civil Engineering Division Council.

Since the capacity of the gas cartridge is less than 500 ml, the same does not come under the purview of gas cylinder rules. Therefore, a separate Indian Standard has been formulated so as to ensure a high standard of manufacture in the interest of safety since these are used in the form of highly pressurized container for operating fire extinguishers in the form of refill.

This standard was first published in 1968 and revised in 1977 and 1985. The principal modifications made in this revision are provision of rationalized capacities, modification in the standard for the material based on the indigenous availability and introduction of epoxy powder coating in place of lead tin coating, apart from incorporating all amendments issued so far.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

GAS CARTRIDGES FOR USE IN FIRE EXTINGUISHERS — SPECIFICATION

(Third Revision)

1 SCOPE

This standard lays down the requirements in respect of material, construction, fixing arrangement, capacities and performance requirements of gas cartridges used for fire extinguishers.

2 REFERENCES

The standards listed below contain provisions which through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

IS No.	Title
319 : 1989	Free cutting leaded brass bars, rods and sections — Specification (<i>fourth revision</i>)
2500 (Part 1) : 2000	Sampling inspection procedures: Part 1 Attribute sampling plans indexed by acceptable quality level (AQL) for lot-by-lot inspection (<i>third revision</i>)
3224 : 2002	Valve fittings for compressed gas cylinders excluding liquefied petroleum gas (LPG) cylinders — Specification (<i>third revision</i>)
4218 (Part 2) : 2001	ISO General purpose metric screw threads: Part 2 General plan
6912 : 1985	Copper and copper alloy forging stock and forgings (<i>first revision</i>)
15222 : 2002	Carbon dioxide as fire extinguishing media for fire protection — Specification

3 GENERAL REQUIREMENTS

3.1 The gas cartridges consists of a cylindrical body, an outlet connection with sealing device (disc) according to arrangement shown in Fig. 1 and threads as given below.

3.2 External LH threads as per following dimensions to be provided:

- a) Major dia 26.8 ± 0.2 Pitch 1.27
Included angle 55°
- b) Major dia $18.6^{+0.1}_{-0.2}$ Pitch 1.81
Included angle 55°
- c) Sealing disc shall be at a depth of 12 ± 0.5 mm from peripheral edge.
- d) For frangible sealing device, thread to be right handed:
Major dia $20^{+0.1}_{-0.2}$ Pitch 1.8
Included angle 55°

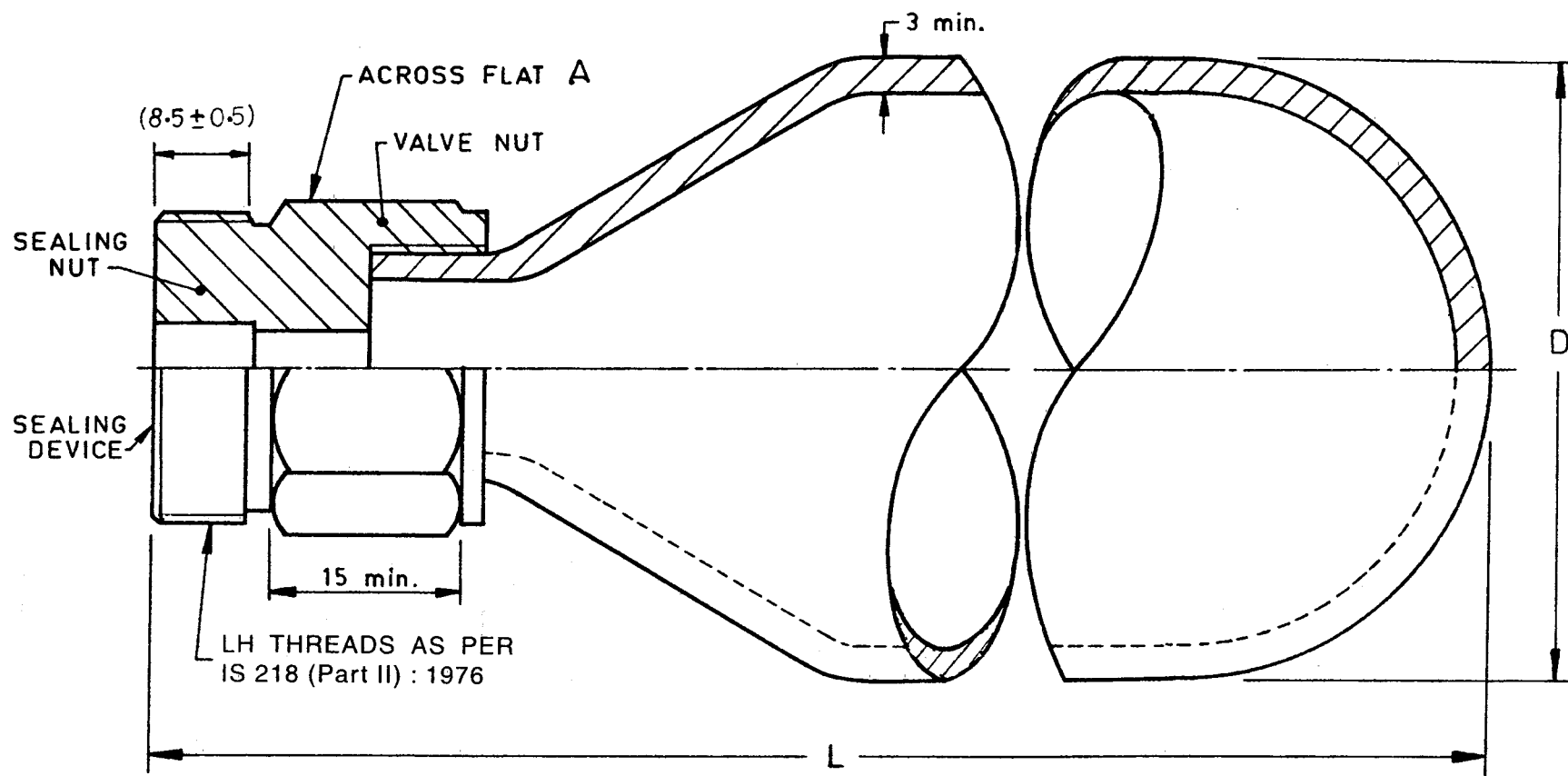
3.3 Gas cartridge required for fire extinguisher having squeeze grip type puncturing and operating mechanism can be manufactured with diameter and length suitable to provide required capacity as given in 6.

4 MATERIAL

4.1 The steel used for the body shall satisfy the following properties:

- a) *Chemical Composition:*
 - 1) Carbon : 0.3 percent, *Max*
 - 2) Silicon : 0.35 percent, *Max*
 - 3) Sulphur : 0.05 percent, *Max*
 - 4) Phosphorous : 0.05 percent, *Max*
 - 5) Manganese : 0.8 percent, *Max*
- b) *Physical Properties:*
 - 1) Tensile strength : 35 kgf/mm², *Min*
 - 2) Yield stress : 25 kgf/mm², *Min*
 - 3) Percentage elongation : 20 percent, *Min*

4.2 The outlet connection and the sealing device and other fittings shall either be of non-ferrous metal or of stainless steel according to the requirement given in IS 3224.



All dimensions in millimetres.

FIG. 1 DETAILS OF GAS CARTRIDGES

4.3 The material for hexagonal head and sealing nut shall conform to IS 6912 or IS 319.

4.4 A protective cap, if provided, shall be screwed over the threaded outlet connection so that threads shall not get damaged during transit and handling.

5 CONSTRUCTION

The gas cartridge shall be manufactured from seamless or welded steel tube or by deep drawing from flat plate. The end shall be closed such that the minimum material thickness is not less than the thickness of the parallel portion. When welded tubes are used or hole in the bottom is welded, it shall be designed so as to allow higher strength (*see 7.2*). The general shape of the body and essential dimensions are given in Fig. 1. The shell of the cylindrical portion shall not vary from the cylindrical form by more than 2 percent of the nominal outside diameter at the point measured. The departure from circularity shall be gradual.

The outlet connection shall be permanently attached to the body after tightening the thread portion.

6 CAPACITY AND CONTENTS

The gas cartridge shall have maximum filling ratio of 0.667, which is the ratio of mass of carbon dioxide (*see IS 15222*) charged in the container to the mass of water required to fill the container at 27°C.

The quantity filled for the various nominal capacity shall be as follows:

<i>Nominal Capacity</i>	<i>Quantity</i>
a) 20 g	20 $^{+5}_{-0}$ g
b) 40 g	40 $^{+5}_{-0}$ g
c) 60 g	60 $^{+10}_{-0}$ g
d) 90 g	90 $^{+10}_{-0}$ g
e) 120 g	120 $^{+10}_{-0}$ g
f) 180 g	180 $^{+10}_{-0}$ g
g) 200 g	200 $^{+10}_{-0}$ g
h) 250 g	250 $^{+10}_{-0}$ g
j) 300 g	300 $^{+10}_{-0}$ g

The water capacity of the container shall be adequate to fill maximum quantity permissible within the prescribed filling ratio.

NOTE — The CO₂ gas to be filled in shall be moisture free and 99 percent pure and shall conform to the requirement of IS 15222.

7 PERFORMANCE REQUIREMENTS

7.1 Each gas cartridge shall be subjected to internal hydraulic pressure of 250 kgf/cm² for a minimum period of one minute before filling. Any leakage deformation, bulging and permanent stretch exceeding 10 percent shall constitute failure.

7.2 In case of ultimate failure test, it shall be tested in a well protected test rig subjected to internal hydraulic pressure equal to 650 kgf/cm² for seamless as well as welded body (*see 5*). The bursting shall not occur.

7.3 Leakage Test

The cartridge after being covered by inverted glass/transparent jar shall be dipped in a suitable water tank filled with water, the level of which is sufficiently higher than height of cartridges for 30 h. There shall not be any collection of even a single bubble on the inside top of the inverted glass after elapse of 30 h. (The air bubbles collected in first 6 h shall be neglected.)

7.3.1 Gas cartridge shall be conditioned for half an hour at 75 °C so that inside temperature also reaches this level. The gas cartridge shall not leak out the contents at this temperature.

8 FINISH

The inside and outside surface shall be smooth and the material section shall be uniform. Epoxy powder coating of 50 microns thickness shall be applied on external surface of the body.

9 MARKING

9.1 Each cartridge shall be clearly and permanently marked with the following information by embossing or punching, near its neck:

- Name of the manufacturer or his trade-mark,
- Type of construction, sealing device and capacity,
- Gross mass of the charged cartridge,
- Mass of the empty cartridge, and
- Year of manufacture.

9.2 BIS Certification Marking

The cartridge, may also be marked with the Standard Mark.

9.2.1 The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act, 1986* and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

10 SAMPLING AND CRITERIA FOR CONFORMITY

10.1 Lot

All gas cartridges of the same type and capacity produced by the same manufacturer shall be grouped together to constitute a lot.

10.2 For ascertaining the conformity each lot shall be considered individually for the purpose of evaluation of quality in accordance with this standard.

10.3 The number of samples to be taken from a lot shall depend on the size of the lot and shall be according to Table 1, which shall be selected at random from a lot.

10.4 Each of the samples selected according to 10.3 shall be examined visually as far as possible in respect of requirement specified in 3, 5, 6 and 9 in respect of hydraulic pressure, etc (*see 7.1*), leakage (*see 7.3*) and finish (*see 8*). The lot shall be considered to be in conformity with this requirement if all the samples pass the relevant requirements.

Table 1 Lots Produced Under Quality Control System
(Clause 10.3)

Number of Items in the Lot (1)	Sample Size (2)
Up to 25	3
26 to 50	5
51 to 100	8
101 and up to 300	8 percent

NOTE — The sampling procedures for lot sizes more than 300 numbers shall be in accordance with IS 2500 (Part 1).

10.5 In respect of ultimate failure test (*see 7.2*) and sealing disc, the manufacturer shall issue a certificate with the lot to the effect that this test had been performed and found satisfactory in respect of the type of gas cartridge presented in the lot. Alternatively one sample shall be tested from the lot and shall meet the requirements given in this clause in the lot to be considered satisfactory in respect of requirements.

10.6 In the absence of a certificate from a manufacturer that all the components parts and fittings are conforming to the requirement of this standard, from a sample gas cartridge one item each of all the component parts and fittings shall be taken separately and examined individually in respect of the relevant requirements laid down in 4. The lot shall be considered satisfactory in respect of component parts and fittings if the sample meets the relevant requirements.

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Amendments Issued Since Publication

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